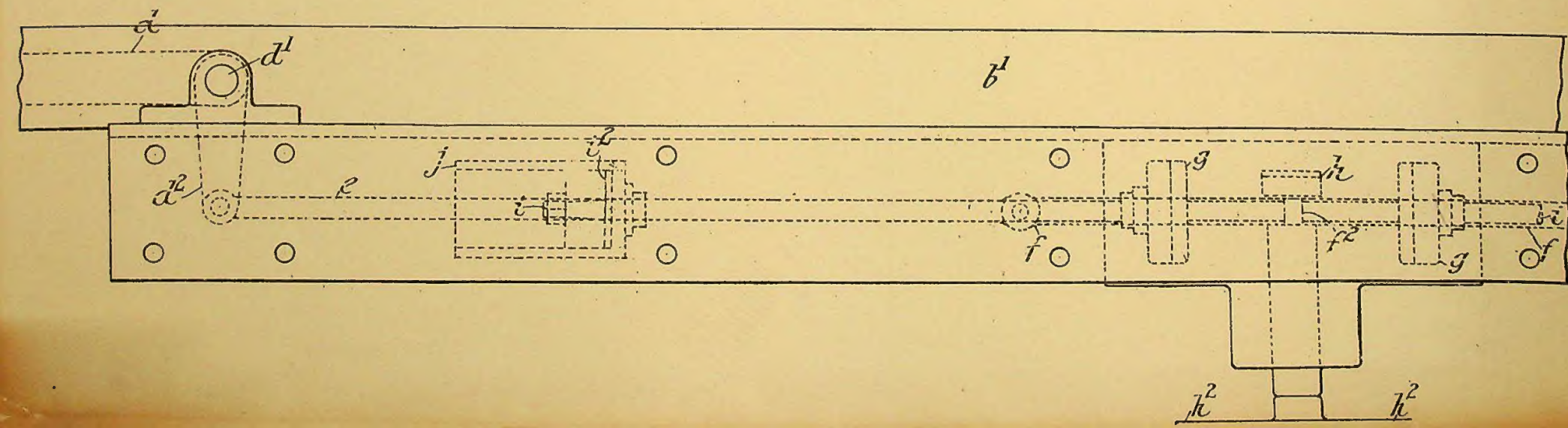


Fig.7.



116. SIGNALS.
Indicators--
Station.

Fig 8.

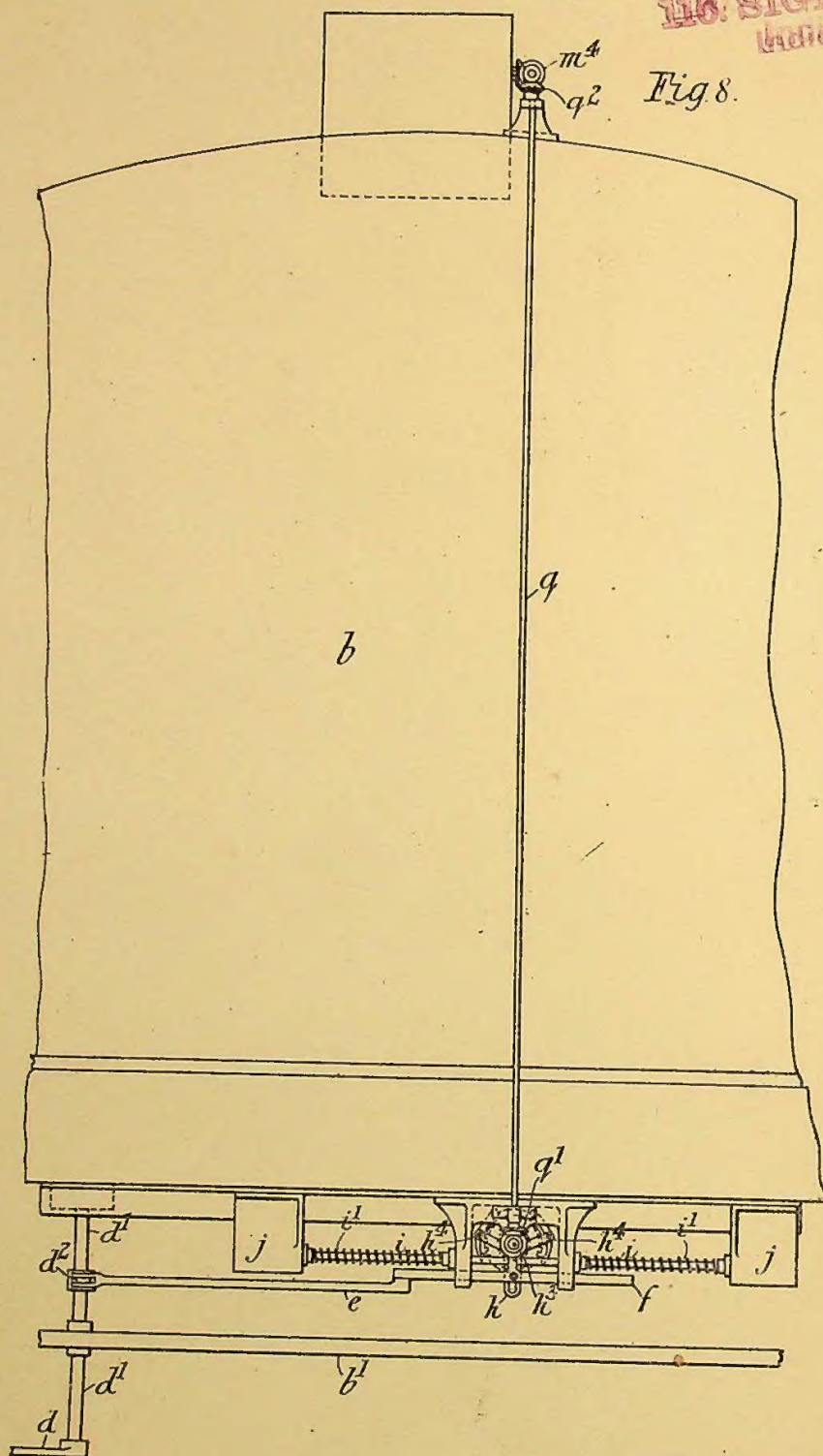


Fig 9.

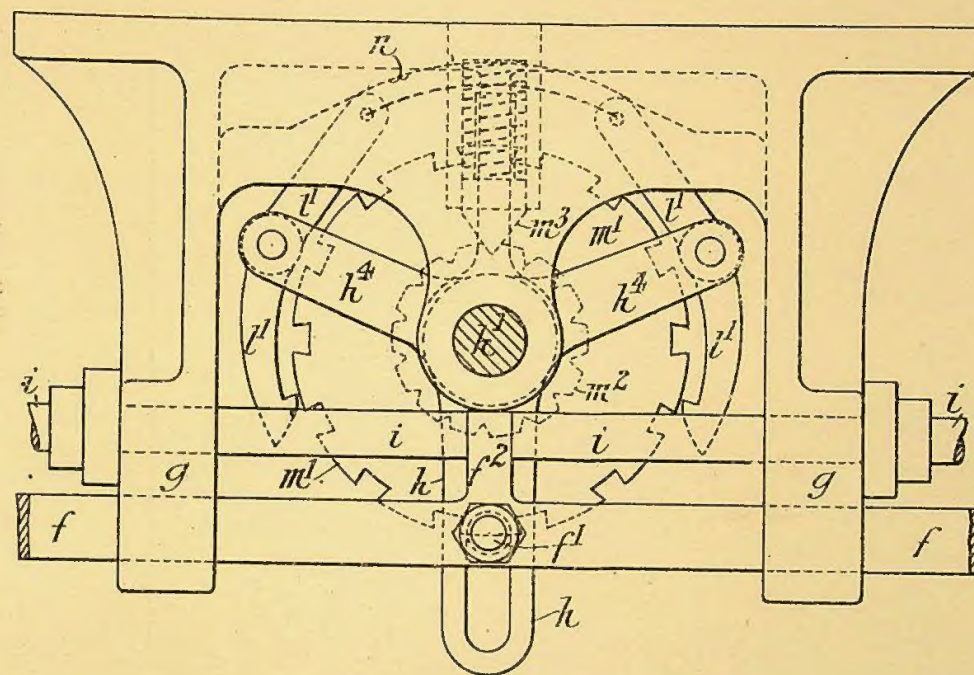
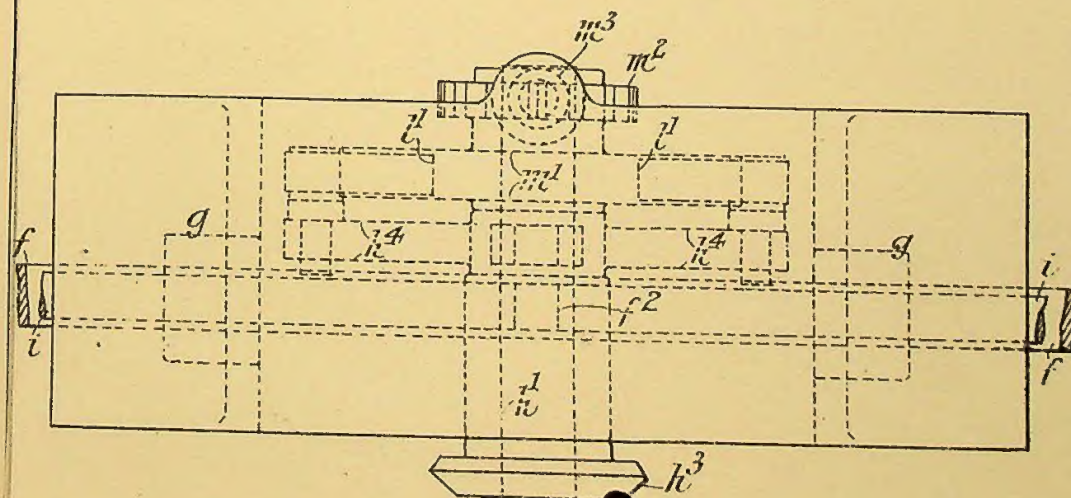


Fig 10.



N^o 13,045

A.D. 1894

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Complete Specification Left, 5th Apr., 1895—Accepted, 11th May, 1895

PROVISIONAL SPECIFICATION.

Improvements in or connected with Apparatus for Indicating Names of Stations in Moving Vehicles.

We, GEORGE WASHINGTON ROBERTSON, Engineer, of 4 St. Helen's Place in the City of London, WILLIAM SAMUEL PAGE, Gentleman, of The Gales, Woodford Bridge, Essex, and CHARLES EDWARD VERNON, Engineer, of Victoria Docks in the County of Essex, do hereby declare the nature of this invention to be as follows:—

The invention relates to improvements upon that class of apparatus for operating station indicators in moving vehicles described in Specifications Nos. 1 and 13166 of 1893 and consists in means for securing an exact operation of the apparatus combined with smoother or quieter working and for enabling the indicating cards to be readily and quickly adjusted when required independently of the normal operating mechanism.

In carrying the present invention into effect we adopt a somewhat similar arrangement of apparatus to that described in Specification No. 1 of 1893 for communicating motion from the prime motion lever to the vertical rod or rods at the end of the carriage and we communicate motion from said vertical rods to the indicators by means of apparatus somewhat similar to that described in Specification No. 13166 of 1893 but we adopt the following modifications; instead of employing a lost motion cam lever as described in Specification No. 1 of 1893 we employ a straight slotted lever to which motion is given in a similar manner to that described in said Specification for giving motion to the lost motion cam lever; we also connect the outer ends of the centering rods to checking apparatus so arranged as to prevent any sudden reaction of the springs acting on the centering rods; this checking apparatus may consist of a cylinder at the outer end of each centering rod and a piston on the latter, or operated thereby, fitting such cylinder; the cylinder is open at one end and is fitted with a valve which admits air between its head and the piston as the latter is travelling towards the open end of the cylinder and closes as the piston travels in the reverse direction, the escape taking place around the piston and piston-rod, or the checking apparatus may be connected to other part of the operating mechanism, and other suitable description of checking apparatus may be employed.

Also instead of causing the pawls to act on the ratchet wheel as they travel in their forward motion, we cause them to act thereon on their return motion for which purpose we form them with hooked noses acting to pull instead of push against the teeth of the ratchet wheel and we cause the tails of the pawls to be acted upon by a cam so as to keep their noses normally clear of the ratchet wheel, and also clear of the same as they descend from such normal position but which shall permit the pawls to approach the periphery of the ratchet wheel as they rise above their normal position so that after having risen to their extreme position they shall in descending fall into gear with one of the teeth and shall pull the ratchet wheel round the required distance, after which the cam will remove them from contact with the ratchet wheel.

We also give an excess or lost motion to the pawls so that they shall rise above the tooth of the ratchet wheel with which they are to gear but so that they shall not travel as far as the next tooth, then in descending the acting pawl will slip into gear with the proper tooth.

[Per se Ed.]

Improvements in Apparatus for Indicating Names of Stations in Moving Vehicles.

By the apparatus above referred to modified as herein described the indicator does not receive motion by the direct action of the first motion lever but by the reaction of one or other of the springs on the centering rods and the action of such springs is rendered slow and smooth by means of checking apparatus as above referred to, so that whether the carriage is running at either a high or low rate of speed the apparatus shall always be worked by the same force and at the same speed by which we avoid communicating shock to and consequent over-running of an injury to the apparatus.

The horizontal shaft on the carriage top operating the indicators is continued to the end of the carriage opposite to that from which it receives motion and is there geared with a horizontal shaft extending across the end of the carriage and formed at each end to receive a key or handle. Thus as the ratchet wheel is normally free from the driving pawls the indicators can be readily adjusted when required to the desired indicating cards by rotating said horizontal shaft which can be effected from either side of the carriage.

As a modification the straight slotted lever above referred to or the lost motion cam lever described in Specification No. 1 of the year 1893 is mounted loosely on its shaft and we fix the double ratchet wheel and the notched adjusting wheel on the same shaft. We also fix on said shaft a bevel wheel taking into a bevel wheel on the lower end of an upright shaft at the end of the carriage the upper end of which by suitable gearing communicates motion to the horizontal shaft on the top of the carriage. The ratchet driving pawls are mounted on the straight slotted lever or lost motion lever and such pawls are arranged in relation to the ratchet wheel and are operated in like manner to that hereinbefore described.

Dated this 5th day of July 1894.

G. W. ROBERTSON,
W. S. PAGE,
CH. E. VERNON,

By Harris & Mills,
23, Southampton Buildings, London, W.C., Agents.

COMPLETE SPECIFICATION.

Improvements in or connected with Apparatus for Indicating Names of Stations in Moving Vehicles.

We, GEORGE WASHINGTON ROBERTSON, Engineer, of 4 St. Helen's Place, in the City of London, WILLIAM SAMUEL PAGE, Gentleman, of The Gales, Woodford Bridge, Essex, and CHARLES EDWARD VERNON, Engineer, of Victoria Docks, in the County of Essex, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to improvements upon that class of apparatus for operating station indicators in moving vehicles described in Specifications Nos. 1 and 13166 of 1893, and consists in means for securing an exact operation of the apparatus combined with smoother or quieter working and for enabling the indicating cards to be readily and quickly adjusted when required, independently of the normal operating mechanism.

In carrying the present invention into effect we adopt a somewhat similar arrangement of apparatus to that described in Specification No. 1 of 1893 for communicating motion from the prime motion lever to the vertical rod or rods at the end of the carriage, and we communicate motion from said vertical rods to the indicators by means of apparatus somewhat similar to that described in Specification No. 13166 of 1893, but we adopt the following modifications.

Improvements in Apparatus for Indicating Names of Stations in Moving Vehicles.

Instead of employing a lost motion cam lever as described in Specification No. 1 of 1893, we employ a straight slotted lever, to which motion is given in a similar manner to that described in said Specification for giving motion to the lost motion cam lever; we also connect the outer ends of the centering rods to a checking apparatus so arranged as to prevent any sudden reaction of the springs acting on the centering rods; this checking apparatus may consist of a cylinder at the outer end of each centering rod and a piston on the latter, or operated thereby, fitting such cylinder; the cylinder is open at one end and is fitted with a valve, which admits air between its head and the piston as the latter is travelling towards the open end of the cylinder and closes as the piston travels in the reverse direction, the escape taking place around the piston and piston rod; or the checking apparatus may be connected to other part of the operating mechanism, and other suitable description of checking apparatus may be employed. Also, instead of causing the pawls to act on the ratchet wheel as they travel in their forward motion, we cause them to act thereon on their return motion, for which purpose we form them with hooked noses acting to pull instead of push against the teeth of the ratchet wheel, and we cause the tails of the pawls to be acted upon by a cam so as to keep their noses normally clear of the ratchet wheel, and also clear of the same as they descend from such normal position, but which shall permit the pawls to approach the periphery of the ratchet wheel as they rise above their normal position so that after having risen to their extreme position, they shall, in descending, fall into gear with one of the teeth and shall pull the ratchet wheel round the required distance, after which the cam will remove them from contact with the ratchet wheel.

We also give an excess or loss motion to the pawls so that they shall rise above the tooth of the ratchet wheel with which they are to gear, but so that they shall not travel as far as the next tooth, then, in descending, the acting pawl will slip into gear with the proper tooth.

The horizontal shaft on the carriage top operating the indicators, is continued to the end of the carriage opposite to that from which it receives motion, and is there geared with a horizontal shaft extending across the end of the carriage and formed at each end to receive a key or handle. Thus, as the ratchet wheel is normally free from the driving pawls, the indicators can be readily adjusted when required to the desired indicating cards by rotating said horizontal shaft, which can be effected from either side of the carriage.

As a modification the straight slotted lever above referred to, or the lost motion cam lever described in Specification No. 1 of the year 1893, is mounted loosely on its shaft and we fix the double ratchet wheel and the notched adjusting wheel on the same shaft. We also fix on said shaft a bevel wheel taking into a bevel wheel on the lower end of an upright shaft at the end of the carriage, the upper end of which, by suitable gearing, communicates motion to the horizontal shaft on the top of the carriage. The ratchet driving pawls are mounted on the straight slotted lever or lost motion lever, and such pawls are arranged in relation to the ratchet wheel and are operated in like manner to that hereinbefore described.

And in order that the said invention may be more clearly understood and readily carried into effect, we will proceed, aided by the accompanying drawings, more fully to describe the same.

Figs. 1 and 2 are opposite end views, Fig. 3 is a partial side view and Fig. 4 is a partial plan, of a railway carriage fitted with station indicating operating mechanism constructed according to our invention.

Fig. 5 is an elevation of parts at the top of the carriage seen from the end of the latter and drawn to a larger scale than the previous figs. and Figs. 6 and 7 are respectively an elevation and a plan of some of the parts fixed to the undercarriage seen from the end and drawn to an enlarged scale.

Fig. 8 is an end view of a railway carriage showing a modification, and Figs. 9 and 10 are parts of the latter drawn to an enlarged scale.

Like parts are marked with similar letters of reference in all the figures.

We will first describe the apparatus represented at Figs. 1 to 7.

Improvements in Apparatus for Indicating Names of Stations in Moving Vehicles.

a a are a pair of rails, *b* a railway carriage body and *c* a cam or incline fixed at one side of the pair of rails. *d* is a first motion lever, which is acted upon by the cam or incline *c* in the travelling of the carriage past the latter. The lever *d* is fixed at the lower end of a shaft *d'* mounted in bearings fixed to a cross bar *b'* and to the undercarriage. *d''* is a short lever fixed to the shaft *d'* and connected by a connecting rod *e* to a slide *f* mounted in bearings formed in brackets *g* and provided with a stud *f'*, which passes into the straight slot of a lever *h* fixed on a shaft *h'* and gives motion to the latter according as it is moved by the first motion lever; the slide *f* has at its centre an arm or projection *f''*, against which centering rods *i* act on opposite sides thereof; these rods *i* are pressed towards the said arm or projection *f''* by springs *i'*, so that after each action of the said parts, the centering rods will bring the lever *h* back to its central position. The parts above described, except the straight slotted lever *h*, are of a similar character to those shown and described in the Specifications hereinbefore referred to, but according to our present invention we connect the outer ends of the centering rods *i* to suitable checking apparatus so arranged as to prevent any sudden reaction of the springs *i'*; the checking apparatus represented in the drawings consists of a cylinder *j* at the outer end of each centering rod *i* and a piston *i''* on the latter, or operated thereby, fitting such cylinder; the cylinders *j* are open at one end and they are each fitted with a valve (not shown) which admits air between its head and the piston as the latter is travelling towards the open end of the cylinder and closes as the piston travels in the reverse direction, the escape of the air from the cylinder at such time taking place around the piston and piston rod. The checking apparatus may be connected to other part of the operating mechanism and other suitable description of checking apparatus may be employed.

On the shaft *h'* is fixed a double armed lever *h''*, which, by rods *k*, is connected to a double armed pawl lever *l* mounted loosely on the shaft *m* mounted in bearings along the top of the carriage and giving motion to each indicator by bevel gearing as shown and described in Specification No. 13166 hereinbefore referred to. The pawl lever *l* is provided with pawls *l'* which, instead of acting on the double ratchet wheel *m'* fixed in the shaft *m* as they travel on their forward motion, are caused to act thereon on their return motion, for which purpose we form them with hooked noses, see Fig. 5, acting to pull instead of push against the teeth of the ratchet wheel, and we cause the tails of the pawls *l'* to be acted upon by a cam *n* so as to keep their noses normally clear of the ratchet wheel *m'* and also clear of the same as they descend from such normal position, but which shall permit the pawls *l'* to approach the periphery of the ratchet wheel as they rise above their normal position, so that after having risen to their extreme position, they shall, in descending, fall into gear with one of the teeth and shall pull the ratchet wheel round the required distance, after which the cam *n* will remove them from contact with the ratchet wheel.

We also give an excess or lost motion to the pawls *l'*, so that they shall rise above the tooth of the ratchet wheel with which they are to gear, but so that they shall not travel as far as the next tooth; then, in descending, the acting pawl will slip into gear with the proper tooth.

By the apparatus above referred to modified as herein shown and described, the indicator does not receive motion by the direct action of the first motion lever *d*, but by the reaction of one or other of the springs *i'* on the centering rods *i*, and the action of such springs is rendered slow and smooth by means of checking apparatus above described, so that whether the carriage is running at either a high or low rate of speed, the apparatus shall always be worked by the same force and at the same speed, by which we avoid communicating shock to and consequent overrunning of and injury to the apparatus.

A notched adjusting wheel *m''* is fixed on the shaft *m* and a spring dog *m'''* acts in connection therewith to secure the correct action of the parts and to hold them securely in position after each action thereon.

The shaft *m* is continued to the end of the carriage opposite to that from which

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It receives motion, and is there geared with the upper end of a vertical shaft *o*, the lower end of which is geared with a horizontal shaft *p* extending across the end of the carriage and formed at each end to receive a key or handle. Thus, as the ratchet wheel *m*¹ is normally free from the driving pawls *P*, the indicators can be readily adjusted when required to the desired indicating cards by rotating said horizontal shaft *p*, which can be effected from either side of the carriage.

We will now describe the modification represented at Figs. 8, 9, 10. In this case the straight slotted lever *h*, or it may be the lost motion cam lever described in Specification No. 1 of the year 1893, is mounted loosely on its shaft *h*¹, and the double ratchet wheel *m*¹ and the notched adjusting wheel *m*² are fixed on the same shaft *h*¹. We also fix on said shaft a bevel wheel *h*² taking into a bevel wheel *q*¹ at the lower end of a shaft *q* at the end of the carriage, which at its upper end has a bevel wheel *q*² taking into a bevel wheel *m*³ fixed on the end of the shaft *m*. The ratchet driving pawls *P* are mounted on arms *h*⁴ forming part of the straight slotted lever *h*, or of the lost motion lever, and such pawls are arranged in relation to the ratchet wheel *m*¹ and are operated in like manner to that above described, except that the noses of the pawls are downwards and act on the ratchet wheel when rising instead of when descending, while the tails of said pawls *P* are acted upon by a cam *n* similar in construction and operation but reversed in position to that hereinbefore described fitted to the top of the carriage. We would however have it understood that the arrangement of the ratchet wheel, notched adjusting wheel and pawls on the same shaft as that carrying the straight slotted lever, is also applicable when using direct action pawls.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is:—

CLAIMS.

1. The combination with station indicator operating apparatus, of means whereby the first motion lever acts to move the indicator driving mechanism into position for action and to compress a spring which by its reaction on a centering rod gives motion to the indicator, substantially as herein shown and described.

2. The combination with station indicator operating apparatus of the character herein described driven by the reaction of one of a pair of springs compressed by the motion of the first motion lever, of checking apparatus acting to prevent the sudden reaction of such springs, substantially as herein shown and described.

3. In station indicator operating mechanism of the character herein described, the placing of the pawl and adjusting mechanism on the same shaft as the straight slotted lever or lost motion cam lever and communicating motion from such shaft to the indicator operating shaft on the top of the carriage by a vertical shaft at the end of the carriage and suitable gearing on said shafts, substantially as herein shown and described.

4. The combination of station indicator operating apparatus of the character herein described, with a cross shaft at one end of the carriage communicating by vertical shaft and gearing with the shaft on the top of the carriage, so that by the application of a key to either end of said cross shaft, the indicators in all the compartments of the carriage can be adjusted at any time without interfering with their normal operating mechanism, substantially as herein shown and described.

5. In apparatus for indicating names of stations in moving vehicles, the various improvements substantially as herein shown and described and for the purpose stated.

Dated this 5th day of April 1895.

HARRIS & MILLS,
23, Southampton Buildings, London, W.C., Agents.